

From: [Kay, Robert](#)
To: [Bardo, Kenneth](#)
Subject: Re: solutia
Date: Tuesday, February 11, 2014 12:35:22 PM

YOU'RE RIGHT! for some reason i thought the red line was the groundwater and the blue line was the river. my bad. just delete the comment.

i'll have my review to you by COB tomorrow

On Tue, Feb 11, 2014 at 12:09 PM, Bardo, Kenneth <bardo.kenneth@epa.gov> wrote:

i'm trying to move this forward for a reason we can talk about later.

also, i see figure A3.7 differently. the red line is the river level with elevations marked on the left side of the graph and it fluctuates wildly between 375 to 404.5. the blue line is the groundwater level with elevations marked on the right side of the graph and it smoothly varies between 384.5 and 386. in that case, their discussion makes sense.

From: Kay, Robert <rtkay@usgs.gov>
Sent: Tuesday, February 11, 2014 11:57 AM
To: Bardo, Kenneth
Subject: Re: solutia

OK, i'll review your earlier submission and edit my review to you to make it the final version.

On Tue, Feb 11, 2014 at 11:06 AM, Bardo, Kenneth <bardo.kenneth@epa.gov> wrote:

lets move forward, they have never been known to be timely. they can submit the requested info along with everything else we are asking for. i'd like to get the letter out COB thursday.

From: Kay, Robert <rtkay@usgs.gov>
Sent: Tuesday, February 11, 2014 11:00 AM
To: Bardo, Kenneth
Subject: Re: solutia

Ken-I'm awaiting the response to our questions to GSI before finalizing my comments.

Depending on their response, I may or may not have significant additional comments to make (max of say 5 comments).

in terms of the comments on section 2.1 of attachment 3--the text refers to a series of figures for support. Figure A3.7 shows water levels in well ESL-MW-A and the Mississippi River. Water levels in the well respond fairly dramatically over short periods of time, particularly if you look at the roughly 3 ft rise on about 2/1/13 and the 7-8 ft rise on about 3/10/13. The river during these periods showed a general reversal from increasing to decreasing water levels (a drop of about 4 ft over 3 months) shortly AFTER the 2/1 increase in groundwater levels and the rise of about 2 ft in river stage in mid-march looks to me to begin, and peak slightly AFTER the rapid increase in groundwater levels occurs.

Both groundwater levels and river stage will increase following recharge events (snowmelt and precipitation), and because the stage of a river (particularly a large one) responds in MUCH SMALLER, and more delayed way to these events, my read of the data is the groundwater levels are responding primarily to recharge events, NOT (as GSI contends) to changes in river stage--at least not in a direct way. You could make the argument that the overall downward trend in groundwater levels from 11/18 through about 2/1, and the overall increase from about 2/1 to 3/15 reflects the impact of the river of groundwater levels, but it likely just reflects that neither the river or the groundwater were receiving recharge from precipitation. I'm not saying that river stage doesn't impact groundwater levels, I'm just saying figure A3.7 doesn't support this interpretation.

the role of precipitation on water levels would be made clearer if precipitation amounts on a given date during the monitoring period could be plotted on either this graph (which would likely require plotting both sets of water level data on the left y-axis and using the right y axis for precipitation amounts) or providing a separate plot of precipitation. this data should then be used to re-interpret what's going on.

call if you have questions.

On Mon, Feb 10, 2014 at 9:35 AM, Bardo, Kenneth <bardo.kenneth@epa.gov> wrote:

Took your draft and have a near complete letter drafted. If anything significant will be provided beyond what you sent, let me know. Also can you check and verify your comment below. I don't see what you are saying given the graph.

Attachment 3.

Section 2.1. There is nothing apparent in figure A3.7 that particularly indicates that groundwater levels are reacting to changes in river stage, particularly in a delayed manner. To the extent that groundwater levels are responding to anything, they appear to be responding more rapidly than the river stage. The water level in ESL-MW-A likely responds primarily to recharge events from precipitation and snowmelt. The Mississippi also is responding these events, but in a much more muted way. Please add precipitation data to this figure or at least provide a figure or table displaying the precipitation events (date, amount, type) during this period. **Are you mixing the water level readings with the river levels? Seems like their statements are represented by the figure??**